

The Thermodynamics of a Ramjet

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Fig. 1: A NACA engineer cleaning a Ramjet circa. 1950 [1]

I. INTRODUCTION

A Ramjet is an airbreathing engine that compresses air using static compression. A typical ramjet operates from speeds of Mach 3 to Mach 6. This report will analyse a Ramjet through the lens of thermodynamics, using idealised Brayton cycles to dissect the sections of the jet and the state variables at each section.

II. THE BRAYTON CYCLE AND THE RAMJET

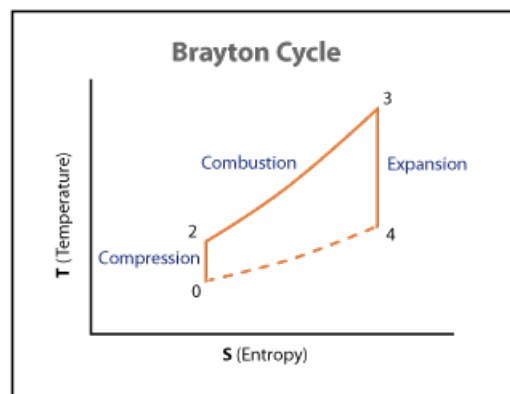


Fig. 2: An idealised Brayton Cycle [2]

A. Inlet and Compression

The inlet of the Ramjet is a

B. Combustor and Combustion

C. Nozzle and Expansion

D. Heat Rejection and cooling

III. CONCLUSION

REFERENCES

- [1] "Naca technician cleans a ramjet in 8- by 6-foot supersonic wind tunnel." [Online]. Available: https://images.nasa.gov/details-GRC-1950-C-25677?fbclid=IwAR1I4lLNCj8oFRWki7opYtk2FaSyQSROFKWyJmHVG05pxn6B_ouRdWINMkY
- [2] "Jet propulsion/thermodynamic cycles." [Online]. Available: https://en.wikibooks.org/wiki/Jet_Propulsion/Thermodynamic_Cycles?fbclid=IwAR2LLB9xj9sYifvgjftlIzhw5BSKzmoTz6c3fQtq5W_v2dpcKOOxem0cEE